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OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			MAY, ROBERT J	
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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/500,295

Applicant(s)

TAKEZAWA, TAKESHI

Examiner

Robert May

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-82 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-13, 16-17, 19-23, 25-30, 33-35, 37-48, 50-55, 58-60, 62-67, 70-73, 75-80 is/are rejected.
- 7) ☒ Claim(s) 4, 7-9, 14-15, 18-19, 24, 26, 31-32, 36, 38, 49, 51, 56-57, 61, 63, 68-69, 74, 76 & 81-82 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/2/2005, 6/29/2004</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Objections***

Claims 8-9 is objected to because it is not entirely clear which reflector (1<sup>st</sup> or 2<sup>nd</sup>) the reflecting surface as claimed is referring to. The examiner construes this to mean the reflecting surface of the 2<sup>nd</sup> mirror reflector.

Claim 19 is objected to because on the 2<sup>nd</sup> line of the claim, "being a design second focus..." is incomprehensible to the examiner when read in light of the specification and drawings.

Claim 4 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 4 recites that the available marginal light being marginal light that is determined depending on the structure of the arc tube which does not differentiate Claim 4 from Claim 1 because no definitive or added structure is defined in Claim 4.

Claims 9,26,38,51,63,76 are objected to because they recite "the outer surface of the 2<sup>nd</sup> reflecting mirror is formed to so as to diffuse-reflect the light incident from the reflecting surface side." does not have enough description in the specification to allow the examiner to understand in what direction the light is being diffuse-reflected and how the outer surface of the 2<sup>nd</sup> reflector is diffuse-reflecting the light if the light is entering from the opposite side of the 2<sup>nd</sup> reflector's outer surface.

Appropriate action is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,3-5,9,12,58,59,63, & 66 is rejected under 35 U.S.C. 102(b) as being anticipated by Matsushita (JP 08-031382) as provided in the applicant's IDS Filed 29 June 2004.

Regarding Claim 1, Matsushita discloses in Drawing 1, an illumination system comprising an arc tube 1 with a light emitting portion 1 including two electrodes 2a, 2b arranged on both sides of the light emitting portion, having sealing portions 3a, 3b on both sides of the light emitting portion, with a 1<sup>st</sup> reflecting mirror 9 arranged on the rear side of the light emitting portion along the longitudinal direction of the arc tube 1, a 2<sup>nd</sup> reflecting mirror 15 arranged on the front side of the light emitting portion, where the diameter of the 1<sup>st</sup> reflecting mirror is larger than the outer surface of the 2<sup>nd</sup> reflecting mirror. Furthermore, the 2<sup>nd</sup> reflecting mirror is shown in Drawing 1, to about half the front side of the light-emitting portion.

Regarding Claim 3, Matsushita discloses in Drawing 1, an illumination system comprising an arc tube 1 with a light emitting portion 1 including two electrodes 2a, 2b

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arranged on both sides of the light emitting portion, having sealing portions 3a, 3b on both sides of the light emitting portion, with a 1<sup>st</sup> reflecting mirror 9 arranged on the rear side of the light emitting portion along the longitudinal direction of the arc tube 1, a 2<sup>nd</sup> reflecting mirror 15 arranged on the front side of the light emitting portion, where the diameter of the 1<sup>st</sup> reflecting mirror is larger than the outer surface of the 2<sup>nd</sup> reflecting mirror. The 2<sup>nd</sup> reflecting mirror is arranged so that light emitted from the center of the light emitting portion and incident on the 2<sup>nd</sup> reflecting mirror and a normal of the 2<sup>nd</sup> reflecting mirror agree or correspond with each other. And furthermore, the diameter of the opening end of the 2<sup>nd</sup> reflector 15 mirror having a size that allows reflection of a boundary light of the light emitted from an end of the arc generating between the electrodes adjacent to the 1<sup>st</sup> reflecting mirror without interception by the 2<sup>nd</sup> reflecting mirror.

Regarding Claims 4 & 58 there is a lack of definitive structure pertaining to the arc tube that is recited other than the marginal light that is determined by the structure of the arc tube. Matsushita has an arc tube structure that defines the marginal light generated by the light-emitting portion of the arc tube 1.

Regarding Claims 5 & 59, Matsushita discloses in Drawing 1, the 2<sup>nd</sup> reflecting mirror is arranged to an outer periphery of the light-emitting portion with a space there between.

Regarding Claims 12 & 66, Matsushita discloses in Drawing 1, adhesive 16 for affixing the 2<sup>nd</sup> reflecting mirror to the sealing portion of the arc lamp.

Regarding Claims 9 & 63 Matsushita discloses a second reflecting mirror that is capable of diffuse reflecting light.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2,17,19, 33-34,38 & 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita.

Regarding Claim 2, Matsushita discloses in Drawing 1, an illumination system comprising an arc tube 1 with a light emitting portion 1 including two electrodes 2a, 2b arranged on both sides of the light emitting portion, having sealing portions 3a, 3b on both sides of the light emitting portion, with a 1<sup>st</sup> reflecting mirror 9 arranged on the rear side of the light emitting portion along the longitudinal direction of the arc tube 1, a 2<sup>nd</sup>

reflecting mirror 15 arranged on the front side of the light emitting portion, where the diameter of the 1<sup>st</sup> reflecting mirror is larger than the outer surface of the 2<sup>nd</sup> reflecting mirror. The 2<sup>nd</sup> reflecting mirror is arranged so that light emitted from the center of the light emitting portion and incident on the 2<sup>nd</sup> reflecting mirror and a normal of the 2<sup>nd</sup> reflecting mirror agree or correspond with each other.

Regarding Claim 2, Matsushita fails to disclose the diameter of the opening end of the 1<sup>st</sup> reflecting mirror within the range that satisfies the range  $\theta_e > \theta_d$  that is approximated by the following equation:  $\theta_d = 90^\circ + \tan^{-1} (L_e/2 + L_r)/d/2$ .

Regarding Claim 2, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the diameter of the opening end of the 1<sup>st</sup> reflecting mirror within a range  $\theta_e > \theta_d$ , since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

Regarding Claims 17 & 19, Matsushita discloses in Drawing 1, an illumination system comprising an arc tube 1 with a light emitting portion 1 including two electrodes 2a, 2b arranged on both sides of the light emitting portion, having sealing portions 3a, 3b on both sides of the light emitting portion, with a 1<sup>st</sup> reflecting mirror 9 arranged on the rear side of the light emitting portion along the longitudinal direction of the arc tube 1, a 2<sup>nd</sup> reflecting mirror 15 arranged on the front side of the light emitting portion.

Regarding Claim 17, Matsushita fails to explicitly disclose a method for adjusting relative position between the 2<sup>nd</sup> mirror and the arc tube such that the images of the electrodes overlap with the reflected images of the electrodes then fixing the arc tube

and the 1<sup>st</sup> mirror together such that the center of the electrodes of the arc tube agrees with the a first focus of the 1<sup>st</sup> reflecting mirror and adjusting the position between the arc tube and the 1<sup>st</sup> mirror so that luminance of the 1<sup>st</sup> reflecting mirror is maximum.

Regarding Claim 17, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the relative positioning of the 2<sup>nd</sup> reflecting mirror to the arc tube and then fixing thereto, then adjusting the arc tube and 2<sup>nd</sup> reflector relative to the 1<sup>st</sup> mirror in order to maximize the luminance since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

Regarding Claims 19, Matsushita fails to explicitly disclose the method of adjusting the position of the arc tube to the 1<sup>st</sup> reflecting mirror then fixing so that the luminance is maximum.

Regarding Claim 19, It would have been obvious to one or ordinary skill in the art to adjust the relative position of the arc tube of Matsushita with the 1<sup>st</sup> reflecting mirror then fixing them so that the luminance is maximum since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

Regarding Claim 33, there is a lack of definitive structure pertaining to the arc tube that is recited other than the marginal light that is determined by the structure of



the arc tube. Matsushita has an arc tube structure that defines the marginal light generated by the light-emitting portion of the arc tube 1.

Regarding Claim 34, Matsushita discloses in Drawing 1, the 2<sup>nd</sup> reflecting mirror is arranged to an outer periphery of the light-emitting portion with a space there between.

Regarding Claim 38, Matsushita discloses a second reflecting mirror that is capable of diffuse reflecting light.

Regarding Claim 41, Matsushita discloses in Drawing 1, adhesive 16 for affixing the 2<sup>nd</sup> reflecting mirror to the sealing portion of the arc lamp.

Claims 35,37,39,40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita as applied to Claim 2 above and further in view of Strobl.

Matsushita is obvious over all of the recited elements as recited in Claim 2 as stated in the above rejection of Claim 2 under 35 U.S.C. 103(a), upon which Claims 35,37,39,40 depend.

Regarding Claim 35, Matsushita fails to disclose the reflecting mirror being formed of a dielectric multilayer that transmits UV and IR Light.

Regarding Claim 35, Strobl discloses in Figure 6, an arc tube lamp comprising reflector systems (140, 142) that have dielectric multilayer coatings that transmits UV and IR light in order to draw heat away from the light source (Col 41, Lines 6-11; Col 45, Lines 31-34). Therefore, it would be obvious to one of ordinary skill to modify the 2<sup>nd</sup>

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reflecting surface of Matsushita with a dielectric multilayer of Strobl in order to transmit UV and IR light to cool the Arc Tube lamp.

Regarding Claim 37, Matsushita fails to disclose the outer surface of the 2<sup>nd</sup> reflecting mirror being formed as to allow light incident from the reflecting surface side to transmit.

Regarding Claim 37, Strobl discloses reflecting systems 140,142 that is formed to reflect visible light on the reflecting side but transmit IR and UV light from the reflecting side (Col 41, Lines 6-11; Col 45, Lines 31-34) in order to cool the arc tube lamp. Therefore, it would be obvious to one of ordinary skill to modify the 2<sup>nd</sup> reflecting surface of Matsushita with a dielectric multilayer of Strobl in order to transmit UV and IR light from the reflecting side to cool the Arc Tube lamp.

Regarding Claim 39, Matsushita fails to disclose the 2<sup>nd</sup> reflector material being made from any one of quartz, light-transmissive alumina, sapphire, YAG and fluorite.

Regarding Claim 39, Strobl discloses the dielectric coating of the reflecting systems 140,142 as almost completely comprising an alumina material (Col 45, Lines 27) or the substrate can comprise a quartz substrate which are suitable materials for a radiation transmitting material for use in forming a reflector for drawing heat away from the conductive surface (Col 45, Lines 32-35) in order to provide cooling for the lamp. Therefore, it would be obvious to one of ordinary skill in the art to modify the 2<sup>nd</sup> reflector of Matsushita with the reflector made of quartz or alumina in Strobl because quartz and alumina are well known in the art to be suitable for use as a reflector material in order to transfer heat away from the light emitting element of the arc lamp.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita as applied to claim 2 above, and further in view of Ookahara (PG Pub 2003/0184200).

Regarding Claims 42, Matsushita is obvious over all of the recited elements as recited in Claim 2 as stated in the above rejection of Claim 2 upon which Claim 42 depend.

Regarding Claim 42, Matsushita fails to disclose the cement as comprising a mixture of silica and alumina or aluminum nitride.

Regarding Claims 42, Ookahara discloses in Figure 2 an adhesive agent 21 comprising a mixture of silica and alumina for securing the arc tube sealing portion to a reflector which is known in the art to be heat resistant and it won't flow into the reflective surface when temperatures become high (Pg 3, 1<sup>st</sup> Para 3<sup>rd</sup> line down). Therefore, it would be obvious to one of ordinary skill in the art to modify the adhesive of Matsushita with the silica alumina adhesive agent of Ookahara because it is a heat resistant adhesive and it won't flow into the reflective surface when temperatures become high.

Claims 6,8,10-11,60,62,64-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita as applied to claims 1 & 3 in the above rejections, and further in view of Strobl (US Pat 6,356,700).

Regarding Claims 6,8,10-11,60,62, & 64, Matsushita discloses all of the elements recited in Claims 1 & 3, as stated in the above rejections of Claims 1 & 3 under 35 U.S.C. 102(b) upon which Claims 6,8,10-11,60,62, & 64-65 depend.

Regarding Claims 6 & 60 Matsushita fails to disclose the reflecting mirror being formed of a dialectic multilayer that transmits UV and IR Light.

Regarding Claims 6 & 60, Strobl discloses in Figure 6, an arc tube lamp comprising reflector systems (140, 142) that have dielectric multilayer coatings that transmits UV and IR light in order to draw heat away from the light source (Col 41, Lines 6-11; Col 45, Lines 31-34). Therefore, it would be obvious to one of ordinary skill to modify the 2<sup>nd</sup> reflecting surface of Matsushita with a dielectric multilayer of Strobl in order to transmit UV and IR light to cool the Arc Tube lamp.

Regarding Claims 8 & 62, Matsushita fails to disclose the outer surface of the 2<sup>nd</sup> reflecting mirror being formed as to allow light incident from the reflecting surface side to transmit.

Regarding Claims 8 & 62, Strobl discloses reflecting systems 140,142 that is formed to reflect visible light on the reflecting side but transmit IR and UV light from the reflecting side (Col 41, Lines 6-11; Col 45, Lines 31-34) in order to cool the arc tube lamp. Therefore, it would be obvious to one of ordinary skill to modify the 2<sup>nd</sup> reflecting surface of Matsushita with a dielectric multilayer of Strobl in order to transmit UV and IR light from the reflecting side to cool the Arc Tube lamp.

Regarding Claims 10 & 64, Matsushita fails to disclose the 2<sup>nd</sup> reflector material being made from any one of quartz, light-transmissive alumina, sapphire, YAG and fluorite.

Regarding Claims 10 & 64, Strobl discloses the dielectric coating of the reflecting systems 140,142 as almost completely comprising an alumina material (Col 45, Lines 27) or the substrate can comprise a quartz substrate which are suitable materials for a radiation transmitting material for use in forming a reflector for drawing heat away from the conductive surface (Col 45, Lines 32-35) in order to provide cooling for the lamp. Therefore, it would be obvious to one of ordinary skill in the art to modify the 2<sup>nd</sup> reflector of Matsushita with the reflector made of quartz or alumina in Strobl because quartz and alumina are well known in the art to be suitable for use as a reflector material in order to transfer heat away from the light emitting element of the arc lamp.

Regarding Claims 11 & 65 Matsushita discloses all of the recited elements of Claim 1, upon which Claim 11 depends, as stated in the above rejection of Claim 1 under 35 U.S.C. 102(b).

Regarding Claims 11 & 65 Matsushita fails to disclose the outer circumference of the light-emitting portion as being coated with an antireflection coating.

Regarding Claims 11 & 65 Strobl discloses in figure 6, an illumination system with an arc tube lamp 72<sub>F</sub> in which the circumference of the outer circumference of the light-emitting portion 42 is optionally coated with an anti reflection coating so that selected light wavelengths can be transmitted and reflected (IR reflection, and visible anti-reflection) in order to maximize the luminescence of the system (Col 49, Lines 63-

67). Therefore, it would be obvious to one of ordinary skill in the art to modify the outer circumference of the light emitting portion of Matsushita by applying the coating of Strobl in order to maximize the luminescence of the system.

Claims 13 & 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita as applied to claim 12 above, and further in view of Ookahara (PG Pub 2003/0184200).

Regarding Claims 13 & 67, Matsushita discloses all of the elements of Claim 12 from which Claim 13 depends as described in the above rejection under 35 U.S.C. 102(b).

Regarding Claims 13 & 67, Matsushita fails to disclose the cement as comprising a mixture of silica and alumina or aluminum nitride.

Regarding Claims 13 & 67, Ookahara discloses in Figure 2 an adhesive agent 21 comprising a mixture of silica and alumina for securing the arc tube sealing portion to a reflector, which is known in the art to be heat resistant and it won't flow into the reflective surface when temperatures become high (Pg 3, 1<sup>st</sup> Para 3<sup>rd</sup> line down). Therefore, it would be obvious to one of ordinary skill in the art to modify the adhesive of Matsushita with the silica alumina adhesive agent of Ookahara because it is a heat resistant adhesive and it won't flow into the reflective surface when temperatures become high.

Claims 16,20-22, 26 & 29, are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita as applied to claim 1 above, and further in view of Kurematsu (US Pat 5,153,752).

Regarding Claim 16, Matsushita discloses the elements of Claim 1 as describe in the above rejection under 35 U.S.C. 102(b) and furthermore discloses the light system as being appropriate for use with a projector system [Para 0012].

Regarding Claim 16, Matsushita fails to disclose an optical modulator for use with a projector with the illumination system.

Regarding Claim 16, Kurematsu discloses an optical modulator for use with a projector system for creating an image using the light from a radiation source such as a lamp or the like (Col 2, Lines 11-14) which is also generally known in the art to do so. Therefore, it would be obvious to use the illumination system of Matsushita with an optical modulator disclosed by Kurematsu for creating an image using the light provided by Matsushita's illumination system.

Regarding Claim 20, Matsushita discloses in Drawing 1, an illumination system comprising an arc tube 1 with a light emitting portion 1 including two electrodes 2a, 2b arranged on both sides of the light emitting portion, having sealing portions 3a, 3b on both sides of the light emitting portion, with a 1<sup>st</sup> reflecting mirror 9 arranged on the rear side of the light emitting portion along the longitudinal direction of the arc tube 1, a 2<sup>nd</sup> reflecting mirror 15 arranged on the front side of the light emitting portion. Furthermore,

Matsushita discloses the light system as being appropriate for use with a projector system [Para 0012].

Regarding Claim 20, Matsushita fails to explicitly disclose an illumination object mounted to the illumination system and fixing the arc tube a to the 1<sup>st</sup> reflecting mirror together after adjusting the relative position between the arc tube and 1<sup>st</sup> reflecting mirror so that the luminance at the position the illumination object is maximized.

Regarding Claim 20, Kurematsu disclose an illumination object being liquid crystal panels for synthesizing the red blue and green light from the white light source being a lamp for creating an image in a projector system (Col 5, Lines 26-31).

Therefore it would be obvious to one of ordinary skill in the art to mount the illumination object of Kurematsu to the illumination system of Matsushita to synthesize the colors to create an image. Furthermore, It would have been obvious to one or ordinary skill in the art to adjust the relative position of the arc tube of Matsushita with the 1<sup>st</sup> reflecting mirror then fixing them so that the luminance is maximum since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

Regarding Claim 21, there is a lack of definitive structure pertaining to the arc tube that is recited other than the marginal light that is determined by the structure of the arc tube. Matsushita has an arc tube structure that defines the marginal light generated by the light emitting portion of the arc tube 1.



Regarding Claim 22, Matsushita discloses in Drawing 1, the 2<sup>nd</sup> reflecting mirror is arranged to an outer periphery of the light emitting portion with a space there between.

Regarding Claim 26, Matsushita discloses a second reflecting mirror that is capable of diffuse reflecting light.

Regarding Claim 29, Matsushita discloses in Drawing 1, cement 16 for affixing the 2<sup>nd</sup> reflecting mirror to the sealing portion of the arc lamp.

Claim 23,25, & 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita in view of Kurematsu as applied to claim 16 above, and further in view of Strobl.

Matsushita in view of Kurematsu discloses all of the recited elements of Claim 16 as stated in the above rejection under 35 U.S.C. 103(a), upon which Claims 23,25,27-28 depend.

Regarding Claim 23, Matsushita in view of Kurematsu fails to disclose the reflecting mirror being formed of a dielectric multilayer that transmits UV and IR Light.

Regarding Claim 23, Strobl discloses in Figure 6, an arc tube lamp comprising reflector systems (140, 142 that have dielectric multilayer coatings that transmits UV and IR light in order to draw heat away from the light source (Col 41, Lines 6-11; Col 45, Lines 31-34). Therefore, it would be obvious to one of ordinary skill to modify the 2<sup>nd</sup> reflecting surface of Matsushita with a dielectric multilayer of Strobl in order to transmit UV and IR light to cool the Arc Tube lamp.

Regarding Claim 25, Matsushita in view of Kurematsu fails to disclose the outer surface of the 2<sup>nd</sup> reflecting mirror being formed as to allow light indent from the reflecting surface side to transmit.

Regarding Claim 25, Strobl discloses reflecting systems 140,142 that is formed to reflect visible light on the reflecting side but transmit IR and UV light (Col 41, Lines 6-11; Col 45, Lines 31-34) in order to cool the arc tube lamp. Therefore, it would be obvious to one of ordinary skill to modify the 2<sup>nd</sup> reflecting surface of Matsushita with a dielectric multilayer of Strobl in order to transmit UV and IR light from the reflecting side to cool the Arc Tube lamp.

Regarding Claim 27, Matsushita in view of Kurematsu fails to disclose the 2<sup>nd</sup> reflector material being made from any one of quartz, light-transmissive alumina, sapphire, YAG and fluorite.

Regarding Claim 27, Strobl discloses the dielectric coating of the reflecting systems 140,142 as almost completely comprising an alumina material (Col 45, Lines 27) or the substrate can comprise a quartz substrate which are suitable materials for a radiation transmitting material for use in forming a reflector for drawing heat away from the conductive surface (Col 45, Lines 32-35) in order to provide cooling for the lamp. Therefore, it would be obvious to one of ordinary skill in the art to modify the 2<sup>nd</sup> reflector of Matsushita in view of Kurematsu with the reflector made of quartz or alumina in Strobl because quartz and alumina are well known in the art to be suitable for use as a reflector material in order to transfer heat away from the light emitting element of the arc lamp.

Regarding Claim 28, Matsushita in view of Kurematsu fails to disclose an antireflection coating on the outer circumference of the light emitting portion.

Regarding Claim 28, Strobl discloses in Figure 6, an illumination system with an arc tube lamp 72<sub>F</sub> in which the circumference of the outer circumference of the light-emitting portion 42 is optionally coated with an anti reflection coating so that selected light wavelengths can be transmitted and reflected (IR reflection, and visible anti-reflection) in order to maximize the luminescence of the system (Col 49, Lines 63-67). Therefore, it would be obvious to one of ordinary skill in the art to modify the outer circumference of the light-emitting portion of Matsushita in view of Kurematsu by applying the coating of Strobl in order to maximize the luminescence of the system.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita in view of Kurematsu as applied to claim 29 in the above rejection under 35 U.S.C. 103(a), and further in view of Ookahara.

Matsushita in view of Kurematsu discloses all of the elements of Claim 29 from which Claim 30 depends as described in the above rejection under 35 U.S.C. 103(a).

Regarding Claim 30, Matsushita in view of Kurematsu fails to disclose the cement as comprising a mixture of silica and alumina or aluminum nitride.

Regarding Claim 30, Ookahara discloses in Figure 2 an adhesive agent 21 comprising a mixture of silica and alumina for securing the arc tube sealing portion to a reflector, which is known in the art to be heat resistant and it won't flow into the

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reflective surface when temperatures become high (Pg 3, 1<sup>st</sup> Para 3<sup>rd</sup> line down).

Therefore, it would be obvious to one of ordinary skill in the art to modify the adhesive of Matsushita with the silica alumina adhesive agent of Ookahara because it is a heat resistant adhesive and it won't flow into the reflective surface when temperatures become high.

Claims 45-47, 51 & 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita as applied to claim 2 in the above rejection under 35 U.S.C. 103(a), and further in view of Kurematsu (US Pat 5,153,752).

Regarding Claim 45, Matsushita is obvious over the elements recited in Claim 2 upon which Claim 45 depends as stated in the above rejection of Claim 2 under 35 U.S.C. 103(a) and furthermore discloses the light system as being appropriate for use with a projector system [Para 0012].

Regarding Claim 45, Matsushita fails to disclose an optical modulator for use with a projector.

Regarding Claim 45, Kurematsu discloses an optical modulator for use with a projector system for creating an image using the light from a radiation source such as a lamp or the like (Col 2, Lines 11-14) which is also generally known in the art to do so. Therefore, it would be obvious to use the illumination system of Matsushita with an optical modulator disclosed by Kurematsu for creating an image using the light provided by Matsushita's illumination system.

Regarding Claim 46, there is a lack of definitive structure pertaining to the arc tube that is recited other than the marginal light that is determined by the structure of the arc tube. Matsushita has an arc tube structure that defines the marginal light generated by the light emitting portion of the arc tube 1.

Regarding Claim 47, Matsushita discloses in Drawing 1, the 2<sup>nd</sup> reflecting mirror is arranged to an outer periphery of the light emitting portion of the arc tube with a space there between.

Regarding Claim 51, Matsushita discloses a second reflecting mirror that is capable of diffuse reflecting light.

Regarding Claim 54, Matsushita in view of Kurematsu discloses in Drawing 1, adhesive 16 for affixing the 2<sup>nd</sup> reflecting mirror to the sealing portion of the arc lamp.

Claim 48, 50, & 52-53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita in view of Kurematsu as applied to claim 45 above, and further in view of Strobl.

Regarding Claim, Matsushita in view of Kurematsu discloses all of the recited elements of Claim 45 upon which Claims 48, 50, & 52-55 depends as stated in the above rejection of Claim 45 under 35 U.S.C. 103(a).

Regarding Claim 48, Matsushita in view of Kurematsu fails to disclose the reflecting mirror being formed of a dielectric multilayer that transmits UV and IR Light.

Regarding Claim 48, Strobl discloses in Figure 6, an arc tube lamp comprising reflector systems (140, 142) that have dielectric multilayer coatings that transmits UV and IR light in order to draw heat away from the light source (Col 41, Lines 6-11; Col 45, Lines 31-34). Therefore, it would be obvious to one of ordinary skill to modify the 2<sup>nd</sup> reflecting surface of Matsushita in view of Kurematsu with a dielectric multilayer of Strobl in order to transmit UV and IR light to cool the Arc Tube lamp.

Regarding Claim 50, Matsushita in view of Kurematsu fails to disclose the outer surface of the 2<sup>nd</sup> reflecting mirror being formed as to allow light indent from the reflecting surface side to transmit.

Regarding Claim 50, Strobl discloses reflecting systems 140,142 that is formed to reflect visible light on the reflecting side but transmit IR and UV light (Col 41, Lines 6-11; Col 45, Lines 31-34) in order to cool the arc tube lamp. Therefore, it would be obvious to one of ordinary skill to modify the 2<sup>nd</sup> reflecting surface of Matsushita with a dielectric multilayer of Strobl in order to transmit UV and IR light from the reflecting side to cool the Arc Tube lamp.

Regarding Claim 52, Matsushita in view of Kurematsu fails to disclose the 2<sup>nd</sup> reflector material being made from any one of quartz, light-transmissive alumina, sapphire, YAG and fluorite.

Regarding Claim 52, Strobl discloses the dielectric coating of the reflecting systems 140,142 as almost completely comprising an alumina material (Col 45, Lines 27) or the substrate can comprise a quartz substrate which are suitable materials for a radiation transmitting material for use in forming a reflector for drawing heat away from

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the conductive surface (Col 45, Lines 32-35) in order to provide cooling for the lamp.

Therefore, it would be obvious to one of ordinary skill in the art to modify the 2<sup>nd</sup> reflector of Matsushita with the reflector made of quartz or alumina in Strobl because quartz and alumina are well known in the art to be suitable for use as a reflector material in order to transfer heat away from the light emitting element of the arc lamp.

Regarding Claim 53, Matsushita in view of Kurematsu fails to disclose the outer circumference of the light-emitting portion as being coated with an antireflection coating.

Regarding Claim 53, Strobl discloses in figure 6, an illumination system with an arc tube lamp 72<sub>F</sub> in which the circumference of the outer circumference of the light-emitting portion 42 is optionally coated with an anti reflection coating so that selected light wavelengths can be transmitted and reflected (IR reflection, and visible anti-reflection) in order to maximize the luminescence of the system (Col 49, Lines 63-67). Therefore, it would be obvious to one of ordinary skill in the art to modify the outer circumference of the light emitting portion of Matsushita in view of Kurematsu by applying the coating of Strobl in order to maximize the luminescence of the system.

Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita in view of Kurematsu as applied to claim 54 above, and further in view of Ookahara.

Regarding Claim 55, Matsushita in view of Kurematsu discloses all of the elements of Claim 54 from which Claim 55 depends as described in the above rejection under 35 U.S.C. 103(a).

Regarding Claim 55, Matsushita in view of Kurematsu fails to disclose the cement as comprising a mixture of silica and alumina or aluminum nitride.

Regarding Claim 55, Ookahara discloses in Figure 2 an adhesive agent 21 comprising a mixture of silica and alumina for securing the arc tube sealing portion to a reflector, which is known in the art to be heat resistant and it won't flow into the reflective surface when temperatures become high (Pg 3, 1<sup>st</sup> Para 3<sup>rd</sup> line down). Therefore, it would be obvious to one of ordinary skill in the art to modify the adhesive of Matsushita with the silica alumina adhesive agent of Ookahara because it is a heat resistant adhesive and it won't flow into the reflective surface when temperatures become high.

Claims 70-73, 75-77, & 79, are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita in view of Strobl as applied to claim 8 above, and further in view of Kurematsu.

Regarding Claim 70, Matsushita in view of Strobl discloses the elements of Claim 8 as describe in the above rejection under 35 U.S.C. 103(a) and furthermore discloses the light system as being appropriate for use with a projector system [Para 0012].

Regarding Claim 70, Matsushita in view of Strobl fails to disclose an optical modulator for use with a projector with the illumination system.



Regarding Claim 70, Kurematsu discloses an optical modulator for use with a projector system for creating an image using the light from a radiation source such as a lamp or the like (Col 2, Lines 11-14) which is also generally known in the art to do so. Therefore, it would be obvious to use the illumination system of Matsushita in view of Strobl with an optical modulator disclosed by Kurematsu for creating an image using the light provided by Matsushita's illumination system.

Regarding Claim 71, Matsushita in view of Strobl discloses in Drawing 1 of Matsushita, adhesive 16 for affixing the 2<sup>nd</sup> reflecting mirror to the sealing portion of the arc lamp.

Regarding Claim 72, Matsushita in view of Strobl discloses in Drawing 1 of Matsushita, the 2<sup>nd</sup> reflecting mirror arranged to an outer periphery of the light emitting portion with a space there between.

Regarding Claim 73, Matsushita in view of Strobl discloses in Figure 6 of Strobl, an arc tube lamp comprising reflector systems (140, 142) that have dielectric multilayer coatings that transmits UV and IR light in order to draw heat away from the light source (Col 41, Lines 6-11; Col 45, Lines 31-34).

Regarding Claim 75, Matsushita in view of Strobl discloses in Strobl, reflecting systems 140,142 that is formed to reflect visible light on the reflecting side but transmit IR and UV light incident from the reflecting side (Col 41, Lines 6-11; Col 45, Lines 31-34) in order to cool the arc tube lamp.

Regarding Claim 77, Matsushita in view Strobl discloses in Strobl, the dielectric coating of the reflecting systems 140,142 as almost completely comprising an alumina

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material (Col 45, Lines 27) or the substrate can comprise a quartz substrate which are suitable materials for a radiation transmitting material for use in forming a reflector for drawing heat away from the conductive surface (Col 45, Lines 32-35) in order to provide cooling for the lamp.

Regarding Claim 76, Matsushita discloses a second reflecting mirror that is capable of diffuse reflecting light.

Regarding Claim 78, Matsushita in view of Strobl discloses in Strobl, in figure 6, an illumination system with an arc tube lamp 72<sub>F</sub> in which the circumference of the outer circumference of the light-emitting portion 42 is optionally coated with an anti reflection coating so that selected light wavelengths can be transmitted and reflected (IR reflection, and visible anti-reflection) in order to maximize the luminescence of the system (Col 49, Lines 63-67).

Regarding Claim 79, Matsushita in view of Strobl discloses in Matsushita, adhesive 16 for affixing the 2<sup>nd</sup> reflecting mirror to the sealing portion of the arc lamp.

Claim 80 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita in view of Strobl and Kurematsu as applied to claim 79 above, and further in view of Ookahara.

Regarding Claim 80, Matsushita in view of Strobl and Kurematsu disclose all of the elements recited in Claim 79 as stated in the above rejection under 35 U.S.C. 103(a).

Regarding Claim 80, Matsushita in view of Strobl and Kurematsu fails to disclose the adhesive as containing a mixture of silica and alumina or aluminum nitride.

Regarding Claim 80, Ookahara discloses in Figure 2 an adhesive agent 21 comprising a mixture of silica and alumina for securing the arc tube sealing portion to a reflector, which is known in the art to be heat resistant and it won't flow into the reflective surface when temperatures become high (Pg 3, 1<sup>st</sup> Para 3<sup>rd</sup> line down). Therefore, it would be obvious to one of ordinary skill in the art to modify the adhesive of Matsushita with the silica alumina adhesive agent of Ookahara because it is a heat resistant adhesive and it won't flow into the reflective surface when temperatures become high.

***Allowable Subject Matter***

Claims 7,14-15,18,24,31-32,36,49,56-57,61,68-69,74, & 81-82 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claims 7,24,36,49,61 & 74, the prior art does not teach or suggest an illumination system wherein the 2<sup>nd</sup> reflecting mirror is formed by face-grinding or press molding a pipe having an inside diameter larger than the outside diameter of the sealing portion.

Regarding Claims 14-15,31-32,43-44,56-57,68-69, &81-82, the prior art does not teach or suggest an illumination system wherein the 2<sup>nd</sup> reflecting mirror is pressure-fixed to a vicinity of the light emitting portion of the arc tube with a spring wound around an outer circumference of a sealing portion with a space there between.

Regarding Claim 18, the prior art does not teach or suggest the method for manufacturing an illumination system according to Claim 17, using a pickup image with a camera and adjusting the position of the 2<sup>nd</sup> reflecting mirror so that the real image overlaps with the reflected image.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fujimori (JP2005070216A) discloses an arc tube lamp with two reflectors arranged on the same optical axis in opposed fashion

Sugimoto (6,369,492) discloses a lighting unit with reflecting mirror using an adhesive with silica and alumina

Takizawa (6,540,364) discloses a projector using an optical modulator with an illumination system

Igarashi (5,861,715) discloses a lamp with a reflector having a plurality of coating layers for optical efficiency.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert May whose telephone number is (571) 272-5919. The examiner can normally be reached between 9 am– 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300 for all communications.

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RM

2/14/2006



JOHN ANTHONY WARD  
PRIMARY EXAMINER